

## A Unified Account of *(Ta)myen*-Conditionals in Korean

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### 0. Introduction

The purpose of this paper is to explore some syntactic and semantic facts about Korean conditionals. In Korean, conditional sentences are typically associated with the verbal suffixes, *-myen* or *-tamyen* which are attached to the head verb in the antecedent of a conditional<sup>1</sup> (henceforth *myen*- and *tamyen*-conditionals, respectively). The main focus of this study will lie on a truth-conditional semantic account of two facts about *myen*- and *tamyen*-conditionals. First, unlike their English counterparts, *(ta)myen*-conditionals do not give any syntactic clues from which we can tell whether they have indicative or counterfactual interpretations. The two different interpretations solely depend on the utterance contexts. Second, *tamyen*-conditionals differ from *myen*-conditionals in that the former cannot be used when the proposition denoted by the antecedent is a given fact, while the latter do not have such a constraint.

As for the semantic framework, this paper draws to a large extent on the theories that are developed by Kratzer (1980) and Heim (1992). In section 1, a syntactic analysis of conditionals is provided based on the framework of Generalized Phrase Structure Grammar (henceforth GPSG, cf. Gazdar, Klein, Pullum, and Sag (1985), henceforth GKPS). In section 2, the general semantic properties of Korean conditionals are discussed together with some semantic differences and similarities among the varieties of *myen*-conditionals. In section 3, based on Kratzer (1980), Heim (1992) and Roberts (1994), a unified version of the truth

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<sup>1</sup>Bak(1987) also regards *-tako hamyen* as an independent conditional form, but this conditional seems to be another instance of the *myen*-conditional. This matter will be discussed in section 2.

conditions for indicative and counterfactual conditionals is proposed, which may be considered as a hybrid of Kratzer (1980) and Heim (1992). On this approach, different usages of conditionals marked by different morphology (e.g., Korean) or syntax (e.g., English) are accounted for by the assumption that they have different presuppositions. Section 4 is the conclusion of this paper, where some remaining problems are discussed.

### 1. Syntax of (*ta*)*myen*-conditionals

A *myen*-conditional structure in Korean consists of two clauses like those in English: the antecedent and consequent. Unlike in English, however, the morpheme representing a conditional in Korean is syntactically not an independent word. It is a suffix that is attached to the head verb of the antecedent clause.

- (1)    Nayil            pi-ka            o-myen,            sophwung-un    chwiso-toyl-kesita.  
       tomorrow    rain-NOM        come-COND       picnic-FOC       will-be-canceled  
       'If it rains tomorrow, the picnic will be canceled.'

Another difference is that the linear order between the antecedent and consequent is fixed in normal speech. The antecedent which carries the conditional morpheme always precedes the consequent.<sup>2</sup>

- (2)    \*Sophwung-un    chwiso-toyl-kesita.    Nayil            pi-ka            o-myen  
       picnic-FOC       will-be-canceled       tomorrow       rain-NOM       come-COND

In the GPSG framework, this construction can be generated (or licensed) by using the following ID-rule.

- (3)    S            →        S[COND],    H

Here, COND is a head feature and so it percolates down to the lexical head of the antecedent clause by the Head Feature Convention. The value of COND can be a form of the conditional morpheme: e.g., COND={*myen*, *tamyen*,...}.<sup>3</sup> This COND feature can be considered a semantically potent feature which contributes to the semantic interpretation of the structure in which it occurs (GKPS: 223-225). These semantically potent features make their contribution to the interpretation at the highest point of occurrence.

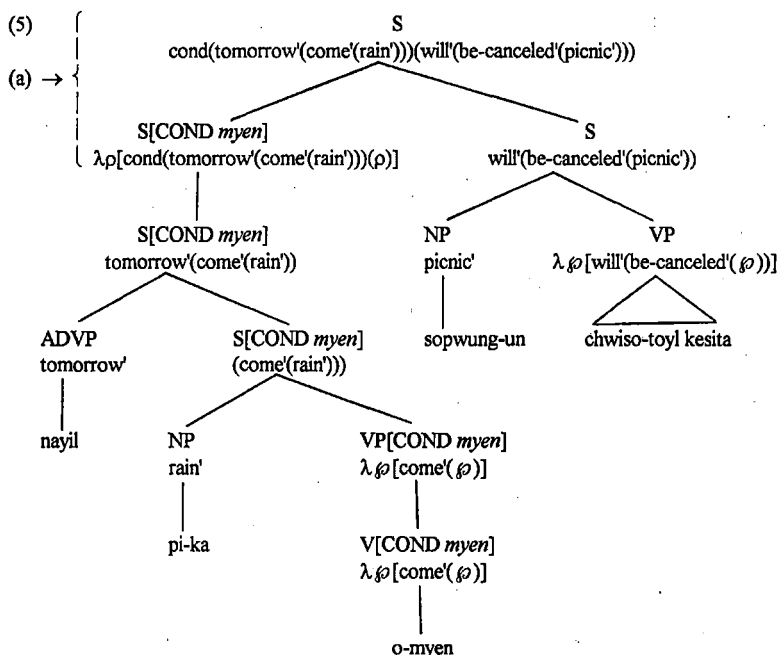
The definition of the features in GKPS is in (4). Here, *C* and *C<sub>0</sub>* stand for a daughter node and a mother node respectively, in a local subtree.

<sup>2</sup>In colloquial style, the consequent sometimes precedes the antecedent, giving rise to a so-called afterthought expression.

<sup>3</sup>Precisely speaking, *tamyen* is a complex morpheme consisting of declarative sentence marker *ta* and conditional marker *myen*. This will be discussed in section 2.

- (4) Let  $f$  be a semantical feature. Then a feature specification  $\langle f, \alpha \rangle$  is semantically potent on a daughter node labeled  $C$  in a local subtree  $t$  iff
- (i)  $\langle f, \alpha \rangle \in C$ , and
  - (ii) it is not the case that  $\langle f, \alpha \rangle \in C_0$  (GKPS:224)

(4) states that a feature specification (the feature name  $f$  and its value  $\alpha$ ) is a semantically potent feature only if it is realized on a daughter node but not on its mother node in a local tree. Under this assumption, the analysis of (1) is (5). Here  $p$  and  $\phi$  stand for a sentence variable and an NP variable, respectively. Also note that the antecedent clause is treated as a kind of adjunct, i.e., a functor which takes a sentence-type object as its argument and gives another sentence-type object as its value.



In (5), the node where the semantic contribution of the COND feature is made is in the local tree indicated by (a). Here the syntactic category of the mother node is S, while that of the daughter node is S[COND myen], which is the highest S node of the antecedent clause. Hence the semantically potent feature [COND myen] satisfies the definition in (4): [COND myen] is realized on the daughter node but not on the mother node. In local tree (a), "cond" is a semantic representation of the COND feature. In section 3, it will be proposed how a sentence with the COND feature is interpreted with respect to its utterance contexts, i.e., what the truth conditions of  $c + \text{cond}(\phi)(\psi)$  are in terms of Heim (1992).

## 2. General semantic properties of *(ta)myen*-conditionals

(6) a. If John is in London, he will visit his relatives. (indicative)  
 b. [To a friend who is sitting on a chair]  
 If you sit there, you can see a picture on the wall. (indicative)  
 c. If John were in London, he would visit his relatives. (counterfactual)

(7) Mary-ka o { -myen } ku sosik-ul al swu isssta.  
 Mary-NOM come-COND the news-ACC know-will-be-able-to  
 'If Mary comes, we will be able to get the news.'

(8) a. A: Etten hoysa-uy cangkeli-cenhwa-lul iyonghasipni-kka?  
which company-GEN long-distance-call-ACC use-INT  
'Which company do (you) use for long-distance calls?'

b. B: AT&T-lul iyonghapnita.  
AT&T-ACC use  
'(I) use AT&T.'



## (11) (to a woman who is pregnant)

- a. # Ayki-lul nahnun-**tamyen**, emma-ka kipehasil-kesita.  
 baby-ACC give-birth-to-COND mother-NOM be-pleased-will  
 'If (you) give birth to a baby, (your) mother will be pleased.'
- b. Atul-ul nahnun-**tamyen**, emma-ka kipehasil-kesita.  
 son-ACC give-birth-to-COND mother-NOM be-pleased-will  
 'If (you) give birth to a son, (your) mother will be pleased.'
- c. Ayki-lul nahu-**myen**, emma-ka kipehasil-kesita.  
 baby-ACC give-birth-to-COND mother-NOM be-pleased-will  
 'When (you) give birth to a baby, (your) mother will be pleased.'
- d. Atul-ul nahu-**myen**, emma-ka kipehasil-kesita.  
 son-ACC give-birth-to-COND mother-NOM be-pleased-will  
 'If (you) give birth to a son, (your) mother will be pleased.'

## (12) (to a pregnant woman who already knows that she does not bear twins)

- a. Ssangtongi-lul nahnun-**tamyen**, emma-ka nollasil-kesita.  
 twins-ACC give-birth-to-COND mother-NOM be-surprised-will  
 'If (you) gave birth to twins, (your) mother would be surprised.'
- b. Ssangtongi-lul nahu-**myen**, emma-ka nollasil-kesita.  
 twins-ACC give-birth-to-COND mother-NOM be-surprised-will  
 'If (you) gave birth to twins, (your) mother would be surprised.'

In (10), the antecedent is true in an actual world (factual). In this case, the *myen*-conditional in (10b) is acceptable, whereas the *tamyen*-conditional in (10a) is awkward. (11a) is also awkward since if a woman is expecting a baby, then it is a normal course of events that she gives birth to a baby, and thus the antecedent cannot be hypothetical or counterfactual. In contrast, (11b) is acceptable since bearing a baby does not necessarily mean giving birth to a son, and thus the antecedent can be hypothetical. (11c,d) are both acceptable since *myen*-conditionals are possible in all kinds of conditionals. On the other hand, (12a,b) are acceptable since the antecedent is counterfactual.

Then, one question that arises is what the property of the morpheme *ta* is that comes before *myen* and triggers the difference between *myen*- and *tamyen*-conditionals. *Ta* in Korean is a morpheme for the declarative sentence marker, which also occurs in embedded sentences.

- (13) a. Pi-ka o-ass-**ta**.  
 rain-NOM come-PAST-DECL  
 'It rained.'

- b.      Nay-ka              pi-ka              o-ass-ta-ko              malhayssta.  
          I-NOM              rain-NOM              come-PAST-DECL-COMP      said  
          'I said it rained.'

It seems that the appearance of the declarative marker *ta* somehow blocks the speaker's commitment to the truth value of the embedded sentence when it occurs with conditional morpheme *-myen*.<sup>4</sup> And this may be the reason why *-tamyen* is not used in a factual conditional.

The difference can also be seen from telephone conversations. For example, when B hears from A that it is raining now in A's area, B can use a *tamyen*-conditional as well as a *myen*-conditional, even though the fact that it rains in A's area has been mentioned by A just before.

- (14) A: Cikum      yeki              pi-ka              o-n-ta.  
          now      here              rain-NOM              come-PRES-DECL  
          'It is raining here now.'
- B: Kulay!      pi-ka              on-tamyen              canti-ka              salanakeyssney.  
          Oh!              rain-NOM              come-COND              lawn-NOM              comes-to-life-again-FUT  
          'Oh! If it is raining (there now), the lawn will come to life again.'

In this case, a *tamyen*-conditional is possible because B does not need to commit himself to the truth value of the antecedent. B just repeats or uses the assertion of A, not his own assertion. And this shows that *tamyen*-conditionals are in some sense similar to *tako hamyen*-conditionals which will be discussed below.

According to Bak (1987), *tako hamyen* is another form that represents hypothetical or counterfactual conditionals. It seems to me, however, that *tako hamyen* conditionals are just another instance of *myen*-conditionals due to the following reasons. First, there is another conditional form *tako hantamyen* which is similar to *tako hamyen*. *Tako hantamyen* contains the conditional morpheme *tamyen* that only occurs in hypothetical and counterfactual conditionals. In contrast, *tako hamyen* contains the conditional morpheme *myen* which occurs in all three kinds of conditionals. Thus, we have a four part analogy in (15). It would be more natural if we can explain the relationships between them, instead of assuming that all four are separate morphemes.

- (15)    *myen* : *tako hamyen* :: *tamyen* : *tako hantamyen*

In *tako hamyen* and *tako hantamyen*, *tako* is a complex morpheme in which a declarative sentence marker *ta* and a complementizer *ko* are combined. It signals that the preceding element is an embedded clause. The verb *ha* (roughly 'do' in English) in such clause has several different lexical meanings. Among them, the most appropriate meaning in (15) is that of reporting.

<sup>4</sup>At this moment, I do not know the reason why it should be the case.

- Thus, in the following examples,  $(\phi \text{ tako hamyen}, \psi)$  or  $(\phi \text{ tako hantamyen}, \psi)$  are understood to be roughly equivalent to "if the report (or saying) that  $\phi$  is (were) admitted (granted), then  $\psi$ ".

- Tako hamyen-* and *tako hantamyen*-conditionals also show the same property as *myen-* and *tamyen*-conditionals, respectively. *Tako hamyen* is allowed in all three kinds of conditionals, but *tako hantamyen* is not allowed in factual conditionals. For example, when the speaker just heard a weather report from someone that says it will rain tomorrow, it is inappropriate to use *tako hantamyen* in (17), but *tako hamyen* can be used without any awkwardness. From this, we can conclude that *tako hamyen* and *tako hantamyen* are just other instances of *myen* and *tamyen*, respectively. In other words, *tako hamyen* is equivalent to *myen* when we include the meaning of *tako ha* into the meaning of the antecedent (*ṇayil pi-ka on-ta ha* 'it is said that it will rain tomorrow') in that both can be used in factual conditionals. However, *tako hamyen* is also equivalent to *tamyen* when we consider only the embedded proposition without *tako ha* (*ṇayil pi-ka on-ta* 'it will rain tomorrow' in (17)) as the antecedent, in that the speaker does not commit himself/herself to the truth value of the embedded proposition. The speaker just uses information that is reported from a third person. In this case, *tako hamyen*-conditionals can be regarded as hypothetical or counterfactual, but not as factual conditionals.

The summary of this section is as follows. (i) In Korean, the indicative or counterfactual conditionals are not syntactically or morphologically distinguishable; rather the different interpretations come solely from context. (ii) *Tamyen*-conditionals cannot be used when the proposition denoted by the antecedent is known to be true, while in *myen*-conditionals, such a constraint does not exist. (iii) *Tako hamyen*-conditionals differ from *tamyen*-conditionals in that the former only indicates reported information without commenting on its truth or falsity.

### 3. Truth conditional semantics of *(ta)myen*-conditionals

The purpose of this section is to explore the truth conditions of Korean *myen*- and *tamyen*-conditionals. There have been various analyses of English conditionals within the framework of



truth conditional semantics, for example, Stalnaker (1968), Lewis (1973), Kratzer (1980, 1989), Heim (1992), and Roberts (1994) among others. What is common among these analyses is the following intuitive idea. In order to determine the truth or falsity of a whole conditional, we need to hypothetically add a set of worlds or situations in which the proposition denoted by the antecedent is true to the set of the worlds or situations that already exist in the context set. If the proposition denoted by the consequent is true in the added set of worlds or situations, then the whole conditional is true. Otherwise it is false. The above authors differ from each other in how to constrain the set of worlds or situations. This paper will review the theories proposed by Kratzer (1980) and Heim (1992), discussing why their theories are not directly applicable in the case of (ta)myen-conditionals. Following Roberts (1994), we will propose an explanation for the differences and similarities between the two kinds of conditionals by means of slight modifications of Kratzer (1980) and Heim (1992).

### 3.1. Presupposition and the difference between *myen*- and *tamyen*-conditionals

According to Stalnaker (1979), participants in a conversation share a set of propositions which are mutually agreed upon among them. This set of propositions is called the *common ground* of the conversation. Based on the notion of common ground, the context set is defined as the set of possible worlds compatible with the common ground. Given that propositions can be thought as denoting sets of possible worlds, we have: context set =  $\cap$ (common ground). Based on this notion of context set, Stalnaker characterizes making an assertion as reducing the context set in a particular way. This characterization of assertion is compatible with Heim's (1992) context set and her treatment of a sentence meaning as Context Change Potential (CCP). Heim's definitions of the context set and CCP will be discussed shortly.

As already discussed in section 2, *tamyen*-conditionals cannot be used when the proposition *p* denoted by the antecedent is already known to be true (when *p* is a given fact or true in a given context *c* (i.e.  $c \subseteq p$ )), while in *myen*-conditionals, such a constraint does not exist. In this subsection, we will address the following questions: (i) what is the difference between *myen*- and *tamyen*-conditionals, and (ii) how can the difference be represented in truth conditional semantics.

To find an answer to the first question, let us consider the example in (8c) again which shows the contrast between the two conditionals.

- (8) (in a context where the fact that the hearer uses AT&T is already known to be true to A)

c. A:					
Kulayyo,	AT&T-lul	iyonghasi	$\left\{ \begin{array}{l} \text{-myen} \\ \text{\#-ntamyen} \end{array} \right\}$		manhun
right	AT&T-ACC	use-COND			many
hyeythayk-i		issupnita.			
advantage-NOM		exist			
'(you make the) right (choice), if (you) use AT&T, (you) have many advantages.'					

In this example, a *tam*-conditional is awkward because the fact that A uses AT&T is already a part of the A's context set. Then what is the grammatical status of this awkwardness? What is involved in the awkwardness seems to have something to do with a presupposition violation. *Tam*-conditionals presuppose that the proposition  $p$  denoted by the antecedent is not a given fact, i.e.,  $p$  is not true in all the worlds of the context set of the interlocutors. Then, we can say that *tam*-conditional in (8c) is awkward because it violates this presupposition. This assumption seems to be right, because the awkwardness of the sentence in (8c) results from the fact that we cannot tell whether it is true or false. Note that a proposition violating an involved presupposition does not have a truth value (i.e., is not interpretable).

Then how can this presuppositional constraint on *tam*-conditionals be introduced into truth conditional semantics? One of the most recent proposals on presupposition and its projection is Heim (1992), and her framework of Context Change Semantics can accommodate this kind of presuppositional constraint. According to her, the meaning of a sentence is its Context Change Potential (CCP). A CCP is a function from contexts to contexts, and contexts are sets of possible worlds. The change effected by the CCP of a sentence consists of updating the information in the context with the semantic content of the sentence. The presuppositions of a sentence are requirements on the context. They determine to which contexts the CCP of a sentence can be applied. CCP definitions of sentences consist of two parts: the first part is for the presuppositional conditions (called *definedness conditions* in Heim (1992)) and the second part is for information updating. Here the first part can be used for the presuppositional constraint on *tam*-conditionals.

Heim (1992) uses two different CCP definitions shown in (18) and (19) to represent English indicative and counterfactual conditionals, respectively. (20) and (21) are the definitions of *same* and the  $\text{Sim}_w$  function, respectively, which are utilized to define (18) and (19). (22) is the definition of  $\text{rev}(\text{ision})$  function, which is utilized to define (19).

- (18) CCP for English indicative conditionals  
 $c + \text{if } \phi, \psi = \{w \in c: \text{Sim}_w(c + \phi) + \psi = \text{same}\}$
- (19) CCP for English counterfactual conditionals  
 $c + \text{if } \phi \text{ would } \psi = \{w \in c: \text{Sim}_w(\text{rev}_\phi(c) + \phi) + \psi = \text{same}\}$
- (20) If  $c$  is any context,  $\phi$  any LF, ' $c + \phi = \text{same}$ ' expresses the condition that  $c + \phi = c$ .
- (21)  $\text{Sim}_w(p) = \{w' \in W: w' \in p \text{ and } w' \text{ resembles } w \text{ no less than any other world in } p\}$
- (22) For any context  $c$ , LF  $\phi$ :  
 $\text{rev}_\phi(c)$ , the revision of  $c$  for  $\phi$ , is  $\cup\{X \subseteq W: c \subseteq X \text{ and } X + \phi \text{ is defined}\}$

(18) states that indicative conditionals are true only in the set of worlds whose element worlds belong to the hypothetical context set  $\text{Sim}_w(c + \phi)$  which (i) retains all the information in the original context set  $c$  along with that contributed by the antecedent  $\phi$  (i.e.,  $\text{Sim}_w(c + \phi)$  is a set of worlds whose elements belong to  $(c + \phi)$  and resemble  $w$  most closely); and (ii) entails the consequent  $\psi$  (i.e.  $\text{Sim}_w(c + \phi)$  plus the  $\psi$  worlds is the same as  $\text{Sim}_w(c + \phi)$ ). In counterfactual conditionals, the original context set  $c$  is not compatible with  $\phi$ 's information,

and thus the whole conditionals are predicted to be vacuously true if we treat counterfactuals the same as indicatives. To avoid this problem, Heim (1992) uses the revision function in (22).  $Rev_\phi(c)$  is the union of the sets of worlds  $X$  which contain the given context set  $c$  and where the presuppositions of  $\phi$  are satisfied. (19) says that counterfactual conditionals are true only in the set of worlds whose elements belong to a hypothetical context set represented by  $Sim_w(rev_\phi(c) + \phi)$ , which (i) is a set of worlds  $X$  whose subset is the original context set  $c$ , (ii) is defined when the information contributed by the antecedent  $\phi$  is added to it (i.e., the presuppositions of  $\phi$  are satisfied in the set of the worlds denoted by  $rev_\phi(c)$ ), (iii) entails the consequent  $\psi$ , and (iv) whose elements resemble  $w$  most closely.

The definitions of CCPs in (18) and (19) may work for *myen*- and *tamyen*-conditionals if we put a definedness condition (presuppositional constraint) on *tamyen*-conditionals to represent the difference between *myen*- and *tamyen* conditionals, and disjoin (18) and (19) to represent that both conditionals can be used for either indicative or counterfactual conditionals depending on the context, as shown in (23).<sup>5</sup>

- (23) CCP for (ta)myen-conditionals (preliminary version)  
 $[(c + (\phi\text{-tamyen}, \psi)) \text{ is defined iff } c + \phi \neq c]$   
 Where defined,  
 either  $(c + (\phi\text{-}(ta)myen}, \psi)) = \{w \in c: Sim_w(c + \phi) + \psi = \text{same}\}$   
 or  $(c + (\phi\text{-}(ta)myen}, \psi)) = \{w \in c: Sim_w(rev_\phi(c) + \phi) + \psi = \text{same}\}$

The definedness condition in (23) (the part within square brackets) says that *tamyen*-conditionals are defined only when the modified context set  $c + \phi$  (the context set hypothetically modified by addition of the information contributed by the antecedent) is not identical to the original context set  $c$ . That is,  $c + \phi$  equals  $c$  only when  $\phi$ 's information is already a part of the given context  $c$ . Then, this condition amounts to saying that only *tamyen*-conditionals presuppose that the antecedent cannot be a given fact, and thus can account for the difference between *myen*- and *tamyen* conditionals.

If this approach is pursued, however, a question arises about the rest of the CCP, the disjunct clauses. One of the uncontroversial claims may be that in (ta)myen-conditionals, unlike English, the choice between indicative and counterfactual interpretations totally depends on the context. One of the problems for the disjunct clauses is that they provide no way to incorporate this context dependency of the choice of interpretations. (23) simply states that (ta)myen-conditionals can have indicative or counterfactual interpretations, but states nothing about how a certain interpretation is determined by which contexts are picked up by the interlocutors. Moreover, according to (23), the same form can have two different truth conditions, and the conditionals seem to be ambiguous. However, it is hard to say that they are really ambiguous since their interpretations differ only depending on the context in which they are uttered. One way to avoid these problems would be to give only one truth condition to (ta)myen-conditionals for both interpretations, with a device by which the interpretational differences can

<sup>5</sup>In (23),  $(\phi\text{-tamyen}, \psi)$  is an abbreviation of  $\text{cond}[tamyen](\phi)(\psi)$ . (See section 1 for the semantically potent feature COND and its denotation  $\text{cond}$ .) Likewise,  $(\phi\text{-}(ta)myen}, \psi)$  abbreviates  $\text{cond}[tamyen \cup myen](\phi)(\psi)$ .

be pragmatically (contextually) explained. This is accomplished in Kratzer (1980) by the notions of modal base and ordering source. In the next section, those notions will be incorporated into the theory of CCPs. Note that Kratzer's theory alone cannot fully account for Korean conditionals, especially the presuppositional facts discussed in this section, because her theory does not have any explicit device which handles presupposition satisfaction.

### 3.2. Modal base, ordering source, and interpretations of (a)myen-conditionals

In Kratzer (1980), the force of modal expressions like *necessarily*, *possibly* is not absolute, but is relativized to two contextually determined sets of worlds. One is a set of worlds determined by a function called a *modal base*. The modal base is a function which takes a world as its argument and gives a set of propositions called conversational backgrounds. The choice of a certain conversational background is determined by the context in which an expression is uttered. Depending on the context, the conversational background can be realistic, epistemic, deontic, empty, and so on. The set of worlds determined by the modal base is the intersection of the set of propositions assigned to any world  $w \in W$  by the modal base, which gives the set of worlds  $\cap(\text{modal-base}(w))$  (or  $\cap f(w)$ ). The other set of worlds is determined by a function called an *ordering source*. The ordering source function takes a world as input and gives as output an ordering among the worlds where a set of propositions  $g(w)$  are true. The worlds are ordered by  $\leq_{g(w)}$  from the world(s) most like the ideal world to those least like the ideal world. Among the worlds, only the world(s) most like the ideal is (are) considered to be in the domain of the explicit or implicit modal.

As for conditionals, the modal base is  $f'$ , which is a function from possible worlds to sets of propositions, such that for any worlds  $w$ ,  $f'(w) = f(w) \cup \{p\}$ . Here  $p$  is the proposition expressed by the antecedent. In this kind of approach, unlike that of Heim (1992), indicative and counterfactual conditionals have the same truth conditions, and different interpretations of the conditionals are obtained by parameterizing the modal base and ordering source. For example, in Kratzer (1980), the material implication interpretation of a human necessity conditional (*if  $\phi$ , then necessarily  $\psi$* ) is obtained by a totally realistic modal base and an empty ordering source, while the counterfactual interpretation of the same conditional is obtained by an empty modal base and a totally realistic ordering source.

Following Roberts (1994), I assume modal base (MB) and ordering source (OS) functions to take an ordered triple  $(i, c, w)$ , where  $i$  represents a modal expression,  $c$  a context,  $w$  a world, instead of just a world argument.<sup>6</sup> Then we may combine the MB and OS functions with Heim's CCPs by revising (23) into (24), with the definitions of Closest Context (CC) in (25) and the ordering  $\leq_{OS(i, c, w)}$  in (26):

<sup>6</sup>Roberts (1994) uses a version of Kratzer's (1989) situation semantics, and thus the triple consists of  $(i, c, s)$ , where  $s$  stands for a situation.

- (24) CCP for (ta)myen-conditionals (final version)  
 $[(c + (\phi\text{-}ta\text{myen}, \psi)) \text{ is defined iff } c + \phi \neq c]$   
 Where defined,  
 $[c + \phi\text{-}(ta)myen, \psi] = \{w \in c: CC_{OS(i,c,w)}[(rev_\phi(c) \cap \cap MB(i,c,w)) + \phi] + \psi = \text{same}\}$
- (25) Definition for the CC (Closest Context) function  
 For all sets of worlds  $X$ ,  
 $CC_{OS(i,c,w)}(X) = \{w: w \in X \text{ and for all } w' \in X, w \leq_{OS(i,c,w)} w'\}$
- (26) Definition for the ordering  $\leq_{OS(i,c,w)}$   
 For all worlds  $w$  and  $w' \in W$ ,  
 $w \leq_{OS(i,c,w)} w'$  iff  $\{p: p \in OS(i,c,w) \text{ and } w' \in p\} \subseteq \{p: p \in OS(i,c,w) \text{ and } w \in p\}$

The definedness condition in (24) is the same as that in (23). However, we do not need the disjunct clauses in (23) any longer due to the functions MB and OS. The choice between the indicative and counterfactual interpretations solely depends on what conversational backgrounds are pragmatically picked up. The  $rev_\phi(c)$  in (24) is a set of worlds in which all the presuppositions of  $\phi$  are satisfied, as already mentioned in section 3.1.  $\cap MB(i,c,w)$  is a set of worlds in which all the propositions in the MB for  $i, c$ , and  $w$  are true. Thus, the intersection of the two (i.e.,  $(rev_\phi(c) \cap \cap MB(i,c,w))$ ) is a set of worlds in the MB for  $i, c$ , and  $w$  in which  $\phi$ 's presuppositions are satisfied. If we add  $\phi$ 's information to this set of worlds, we get  $[(rev_\phi(c) \cap \cap MB(i,c,w)) + \phi]$  which is a set of worlds excluding all the non- $\phi$  worlds from the set of worlds denoted by  $((rev_\phi(c) \cap \cap MB(i,c,w)))$ .

Then we need to pick out a set of the closest world(s) to the ideal world among the set of worlds denoted by  $[(rev_\phi(c) \cap \cap MB(i,c,w)) + \phi]$ . In order for the whole conditional to be true,  $\psi$  must be true in the closest world(s). The closest world(s) is (are) determined by the ordering with respect to the propositions picked up by  $OS(i,c,w)$  as shown in (26). (26) states that  $w$  is closer to the ideal than any other worlds  $w'$  only when the number of the propositions which belong to  $OS(i,c,w)$  and are true in  $w$  is greater than the number of the propositions which belong to  $OS(i,c,w)$  and are true in  $w'$ .<sup>7</sup> Then the value of the CC function in (25) is a set of worlds whose elements belong to the set of worlds denoted by  $[(rev_\phi(c) \cap \cap MB(i,c,w)) + \phi]$  and are closest to the ideal world. In other words, the value of  $CC_{OS(i,c,w)}[(rev_\phi(c) \cap \cap MB(i,c,w)) + \phi]$  is a set of world(s) closest to the ideal in the MB for  $i, c$ , and  $w$  in which  $\phi$ 's

<sup>7</sup>There is a problem concerning the definition of the ordering in (26). According to this definition, as mentioned above, we determine the closest world(s) to the ideal only by counting the number of the propositions which belong to the set of propositions picked up by the  $OS(i,c,w)$  and true in the world(s) in question. If the number of the propositions true in  $w$  is greater than that of the propositions true in  $w'$ , then  $w$  is closer to the ideal than  $w'$ . A problem for this approach is pointed out in Kratzer (1989). She persuasively argues that it is hard to explain all the relevant phenomena of counterfactual conditionals if we just count the number of the true propositions without considering the contents of the propositions. I.e., not all propositions have equal weight. Some are important, while others are totally irrelevant. To avoid the problem, we may need to incorporate the notion of "lumping" into the definition of the ordering in a fashion shown in Roberts (1994).

presuppositions are satisfied and from which all the non- $\phi$  worlds are excluded. Then (24) amounts to saying that a whole (ta)myen-conditional is true only when the set of world(s) denoted by  $CC_{OS(i,c,w)}[(\text{rev}_\phi(c) \cap \cap MB(i,c,w)) + \phi]$  entails  $\psi$ , which is the correct truth conditions for conditionals.

Definition (24) as it is now allows the intersection between the revision function and the intersection of the MB function to be the empty set. This seems to cause a problem since in this case, the  $CC_{OS(i,c,w)}$  function is not defined and thus the whole CCP is not defined either. To solve this problem, I propose a constraint on definedness of  $CC_{OS(i,c,w)}$  as follows:

- (27) Constraint on definedness of  $CC_{OS(i,c,w)}$

For all sets of worlds  $X$ ,  $X$  is in the domain of  $CC_{OS(i,c,w)}$  only if  $X \neq \emptyset$ .

(27) simply stipulates that the argument of the function  $CC_{OS(i,c,w)}$  must not be the empty set in order for the function to be defined.

Then let us consider some examples discussed in section 1. The hypothetical conditional in (7) has an epistemic modal base and an empty ordering source.

- (7)
- |   |           |   |              |                      |
|---|-----------|---|--------------|----------------------|
| Mary-ka   | o         | $\left\{ \begin{array}{l} \text{-myen} \\ \text{-ntamyen} \end{array} \right\}$ | ku sosik-ul  | al swu issta.        |
| Mary-NOM  | come-COND |   | the news-ACC | know-will-be-able-to |
| 'If Mary comes, we will be able to get the news.' |           |   |              |                      |

The value of  $\cap MB(i,c,w)$  is a set of worlds in which all the known propositions are true. In this case, there is no presupposition involved, the value of  $(\text{rev}_\phi(c) \cap \cap MB(i,c,w))$  is the same as that of  $\cap MB(i,c,w)$ . The value of  $[(\text{rev}_\phi(c) \cap \cap MB(i,c,w)) + \phi]$  is a set of worlds of all known propositions minus the worlds in which Mary does not come. The value of  $CC_{OS(i,c,w)}[(\text{rev}_\phi(c) \cap \cap MB(i,c,w)) + \phi]$  is the same as that of  $[(\text{rev}_\phi(c) \cap \cap MB(i,c,w)) + \phi]$  due to the empty ordering source. The empty ordering source assigns an empty set of propositions to all possible worlds, so that we cannot determine an ordering among the worlds with respect to the set of propositions picked up by  $OS(i,c,w)$ . Hence, the value of  $CC_{OS(i,c,w)}[(\text{rev}_\phi(c) \cap \cap MB(i,c,w)) + \phi]$  is the same as that of  $[(\text{rev}_\phi(c) \cap \cap MB(i,c,w)) + \phi]$  in (7). (7) is true only when the consequent *ku sosik-ul al swu issta* ('we will get the news') is true in the set of worlds of  $CC_{OS(i,c,w)}[(\text{rev}_\phi(c) \cap \cap MB(i,c,w)) + \phi]$ .

The modal base of the factual myen-conditional in (8c) has to be totally realistic to guarantee all the facts in  $w$ .

- (8) (in a context where the fact that the hearer uses AT&T is already known to be true to A)

c. A: Kulayyo, AT&T-lul iyonghasi  $\left\{ \begin{array}{l} \text{-myen} \\ \text{\#-ntamyen} \end{array} \right\}$  manhun

right AT&T-ACC use-COND many  
 hyeythayk-i issupnita.  
 advantage-NOM exist  
 '(you make the) right (choice), if (you) use AT&T, (you) have many advantages.'

The value of  $\cap MB(i, c, w)$  is a set of worlds  $w$  where some subset of the propositions true in  $w$  are all true (i.e., a set of worlds in which some of the facts in  $w$  are true). The value of  $(rev_\phi(c) \cap \cap MB(i, c, w))$  is the set of worlds in which the presuppositions of the antecedent *AT&T-lul iyongha* ('B uses AT&T') are satisfied. Since no presuppositions exist in the antecedent, the value of  $(rev_\phi(c) \cap \cap MB(i, c, w))$  is the same as that of  $\cap MB(i, c, w)$ . The value of  $[(rev_\phi(c) \cap \cap MB(i, c, w)) + \phi]$  is also the same as that of  $(rev_\phi(c) \cap \cap MB(i, c, w))$ , because the set of worlds in which the antecedent is true is already a part of the set of worlds  $(rev_\phi(c) \cap \cap MB(i, c, w))$ . Here the relevant ordering source is empty. Hence  $CC_{OS(i, c, w)}[(rev_\phi(c) \cap \cap MB(i, c, w)) + \phi]$  does not narrow down the set of worlds of  $[(rev_\phi(c) \cap \cap MB(i, c, w)) + \phi]$  any further. The whole sentence is true only when the consequent *manhun hyeythayk-i issupnita* ('B has many advantages') is true in the set of worlds of  $CC_{OS(i, c, w)}[(rev_\phi(c) \cap \cap MB(i, c, w)) + \phi]$ . The *tamyen*-conditional in (8c) is awkward because it violates the definedness condition in (24), i.e., the context set  $c$  already includes the worlds in which the antecedent is true and thus  $c$  plus the worlds of the antecedent equals  $c$ .

The counterfactual conditional in (9) has an empty modal base and a totally realistic ordering source.

- (9) (in a context where the speaker knows that Mary did not come yesterday)

Mary-ka ecey oass  $\left\{ \begin{array}{l} \text{-umyen} \\ \text{-tamyen} \end{array} \right\}$  te caymi-ka issessultheyntey.

Mary-NOM yesterday came-COND more fun-NOM exist  
 'If Mary had come yesterday, (we) would have had more fun.'

The value of  $\cap MB(i, c, w)$  is a set of all possible worlds. The value of  $[(rev_\phi(c) \cap \cap MB(i, c, w)) + \phi]$  is all possible worlds minus the worlds in which the antecedent *Mary-ka ecey oass* ('Mary had come yesterday') is not true. This set of worlds is further narrowed down by the totally realistic ordering source. The worlds are ordered with respect to their being more or less near to what is actually the case in the world under consideration. Thus, the value of  $CC_{OS(i, c, w)}[(rev_\phi(c) \cap \cap MB(i, c, w)) + \phi]$  is the closest world(s) to the ideal world (what is known to be the case in  $w$ ) in which the antecedent is true. (9) is true only when the consequent *te caymi-ka issessultheyntey* ('we would have had more fun') is true in the world(s) of  $CC_{OS(i, c, w)}[(rev_\phi(c) \cap \cap MB(i, c, w)) + \phi]$ .

In this section, it has been shown that the hybrid theory of Kratzer (1980) and Heim (1992) can account for the truth condition and the presuppositional satisfactions of Korean (*tamyen*-conditionals). In the next section, I will show how this theory can account for the difference between indicative and counterfactual conditionals in English.

### 3.3 Presuppositional constraint on English conditionals

According to Karttunen and Peters (1979), an indicative conditional is used only when it is conventionally implicated that the antecedent is epistemically possible, whereas a counterfactual conditional is used only when it is conventionally implicated that the negation of the antecedent is epistemically possible. We can incorporate their observations into our approach. On our approach, the difference between indicative and counterfactual conditionals in English can also be accounted for by different presuppositional constraints on them, as done for Korean *tamyen*-conditionals. We can define the CCP of English conditionals as in (28), under the assumption that the context set is the same as the epistemic conversational background.<sup>8</sup>

(28) CCP for English conditionals

$[(c + (if \phi_{indic}, \psi))]$  is defined iff  $c + \phi \neq \emptyset$ , and

$(c + (if \phi_{subjunct}, \psi))$  is defined iff  $c + \neg \phi \neq \emptyset$

Where defined,

$[c + if \phi, \psi] = \{w \in c: CC_{OS(i,c,w)}[(rev_{\phi}(c) \cap MB(i,c,w)) + \phi] + \psi = \text{same}\}$

(28) states that an indicative conditional has a presupposition that the antecedent must be compatible with the context, whereas a counterfactual conditional has a presupposition that the negation of the antecedent is compatible with the context set. Note that (28) differs from the definition of Korean conditionals in (24) only in the definedness condition part which specifies the constraint on presuppositional satisfactions. This means the following: the truth condition (information updating part) of the conditionals of the two languages is the same, but the cross-linguistically or language-internally different kinds of conditionals in those languages only have different presuppositional requirements concerning the relationship between the antecedent and its context set.

<sup>8</sup>The assumption that the context set is the same as an epistemic conversational background is compatible with Stalnaker's (1979) common ground of a conversation. As already discussed in section 3.1, the common ground is a set of propositions which is mutually agreed upon among conversationalists. The conversationalists can agree upon only what they believe they know, i.e., those propositions which are established as knowledge for a group of people or a community.



#### 4. Conclusion

In this paper, the syntax and semantics of Korean (*ta*)myen-conditionals were discussed. The syntactic structure of Korean conditionals was analyzed based on the GPSG framework. To account for the semantic contribution of the bound morpheme (*ta*)myen, a new semantically potent feature COND was introduced. Also semantic differences and similarities were explored among the several varieties of myen-conditionals, such as *tamyen*-, *tako hamyen*-, *tako hantamyen*-conditionals. It was shown that how the truth conditions and presupposition conditions of factual, hypothetical, and counterfactual (*ta*)myen-conditionals are determined in a hybrid theory of Kratzer's (1980) modal base/ordering source semantics and Heim's (1992) context change semantics. Also it was shown how this approach can be extended to the account of English indicative and counterfactual conditionals.

Finally, a problem will be pointed out that needs further study. It is not clear why *ta* in *tamyen*, which is usually analyzed as a declarative sentence ending marker, triggers the presupposition that the worlds of the proposition denoted by the antecedent cannot be a part of the worlds of the context set. We may say the similarity between *tamyen* and *tako hamyen* is responsible for this presupposition trigger, but there does not seem to be any principled reason for this. That is, if we assume that *tamyen* is a reduced form of *tako hamyen* by *-ko ha*-deletion (as claimed in Bak (1987)), then we may explain why *ta* in *tamyen* triggers the presupposition. However, a problem for this analysis is that there is no principled reason why *tako hamyen* cannot be reduced to *myen*, rather than *tamyen*, because a *tako hamyen*-conditional seems also to be an instance of a *myen*-conditional, as shown in section 2.

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